

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Cancelled)
2. (Currently Amended) ~~In-situ~~An in-situ testing method for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes ~~according to claim 1, which is characterized by, comprising the steps of applying the cyclic loading alternatively to the multiple zones located along the bore-hole axis, and hence applying the~~ to thereby apply cyclically alternating shear loading at ~~the~~a central soil layer located between ~~the two adjacent loaded zones, and monitoring displacements of a bore-hole wall during application of the cyclic loading imposed on the bore-hole wall at a given testing soil layer.~~
3. (Currently Amended) ~~In-situ~~The in-situ testing method for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 2, which is aimed at deriving the strength by applying the static loading to the central soil layer after the cyclic loading imposed on the same soil layer.
4. (Currently Amended) ~~In-situ~~An in-situ testing method for the evaluation of liquefaction and dynamic characteristics of soils using ~~bore-hole according to claim 1~~bore-holes, which is aimed at inferring the dynamic characteristics of soils from the relations among the amplitudes of cyclic loading, number of cycles and displacements, during the conduct of application of the cyclic loading imposed alternatively on a single zone located along the bore-hole axis, ~~and hence applying the~~ to thereby apply cyclically alternating shear loading at ~~the~~a central soil layer located between ~~the two adjacent loaded zones, wherein displacements of a bore-hole wall during application~~

of the cyclic loading imposed on the bore-hole wall are monitored at a given testing soil layer.

5. (Currently Amended) ~~In-situ~~The in-situ testing method for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 14, ~~which is characterized by wherein~~ the conduct of cyclic loading ~~using~~uses one or some combinations of three loading types, i.e.: (i) compressional loading imposed orthogonal to the bore-hole axis, (ii) torsional loading imposed around the bore-hole axis, and (iii) shear loading imposed parallel to the bore-hole axis.

6. (Cancelled)

7. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~according to claim 6~~comprising a monitoring zonde that is lowered down into the bore-hole and applies pressure to the bore-hole wall via a pressure-transmitting medium, a pressure controlling unit that can change the pressure carried by the medium in the monitoring zonde periodically, and a monitoring unit for monitoring displacement of the bore-hole wall, in which wherein the monitoring zonde is ~~composed of~~comprises multiple cells located along the bore-hole axis that can apply the pressure to the bore-hole wall, and the pressure controlling unit can apply the cyclic pressure alternatively to these multiple cells.

8. (Currently Amended) ~~In-situ~~The in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 7, ~~in which wherein~~ the pressure controlling unit can apply the cyclic pressures alternatively to the top and bottom cells and can apply the static pressure to the central cell.

9. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~according to claim 6~~comprising a monitoring zonde that is lowered down into the bore-hole and applies pressure to the bore-hole wall via a pressure-transmitting medium, a pressure controlling unit that can change the pressure carried by the medium in the monitoring zonde periodically, a monitoring unit for monitoring displacement of the bore-hole wall, which is equipped with the ~~a~~torque generating unit that can apply the cyclic loading around the bore-hole axis with the monitoring cell intimately attached to the bore-hole wall, and the ~~a~~monitoring unit for themonitoring rotational displacements generated by the torsional cyclic loading.

10. (Currently Amended) ~~In-situ~~The in-situ testing method for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 6~~9~~, ~~which is equipped with the~~further comprising a shear load-generating unit that can apply the cyclic loading parallel to the bore-hole axis with the monitoring cell intimately attached to the bore-hole wall, and ~~the~~a monitoring unit for the~~monitoring~~ shear (axial) displacements generated by the cyclic shear loading.

11. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~having~~comprising a monitoring zonde lowered down into the bore-hole, the monitoring zonde is composed of ~~zonde comprising~~ multiple cells that have independent pressure rooms, and each independent cell is designed to apply ~~the~~a loading to the corresponding soil layer by controlling the pressure carried by ~~the~~a liquid medium in the pressure room, and ~~wherein~~ a central cell of the multiple cells ~~can apply the~~applies a static loading, and top and bottom cells ~~that can apply the cyclic loading to the corresponding soil layers, the said monitoring zonde further comprising~~ top and bottom guard cells are provided on top of all the cells and beneath all of the cells, respectively.

12. (Currently Amended) ~~In-situ~~The in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 11, ~~which is equipped with~~further comprising a pore water pressure gauge located at the central cell of the monitoring cellzonde.

13. (Currently Amended) ~~In-situ~~The in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 12, ~~which is equipped with the~~further comprising pore water pressure gauge that possesses a sensor unit on the surface of the inflatable membrane of the central cell.

14. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~in which the~~comprising a monitoring zone~~d~~zonde lowered down into the bore-hole, ~~is composed of said monitoring zone comprising~~ multiple cells that have independent pressure rooms, ~~and with each independent cell is being designed to apply the loading to the~~a corresponding soil layer by controlling the pressure carried by ~~the~~a liquid medium in the pressure room, and each cell is independent and ~~the connections of between~~ the cells are exchangeable.

15. (Currently Amended) ~~In-situ~~The in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 14, wherein each cell is composed of a cell body itself, a cylindrical membrane attached to the circumference of the cell body, ~~and the~~a pressure room filled with a liquid medium located between the cell body and the membrane.

16. (Currently Amended) ~~In-situ~~The in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes according to claim 15, ~~wherein~~further comprising seal plates are inserted ~~in-between~~ the cells, so that the membranes of the adjacent cells can be intimately connected with each other.

17. (Currently Amended) ~~In-situ~~The in-situ testing apparatus ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore holes according to claim 11, which is equipped with the following units, i.e. further comprising~~ a cylinder that generates the pressure carried by the liquid medium in the pressure room, ~~the~~a monitoring unit ~~for measuring the movement of the~~a rod connected to the cylinder ~~rod,~~ and ~~the~~a unit ~~for deriving the displacement of the bore-hole wall from the measurement of the movement of the cylinder rod.~~